Lipids and Renal Disease

Anita Shah, M.D.; Juan Jose Olivero, M.D.

Baylor College of Medicine, Houston, Texas; Houston Methodist Hospital, Houston, Texas

The management of hyperlipidemia in those without renal dysfunction is based on multiple factors, including age, low-density lipoprotein (LDL) cholesterol levels, the presence of diabetes mellitus, a history of cardiovascular disease (CVD), and the 10-year risk of atherosclerotic cardiovascular disease (ASCVD). However, primary and secondary prevention of CVD in patients with chronic kidney disease (CKD) and end-stage renal disease (ESRD) differs from that of the general population. Multiple trials and meta-analyses have been done to determine how aggressively hyperlipidemia should be treated to reduce morbidity and mortality in this unique population. The following are points to remember when treating hyperlipidemia in patients with CKD and ESRD.

- Hypertriglyceridemia is the most common dyslipidemia in patients with CKD who require hemodialysis, whereas high LDL cholesterol is more commonly seen in those requiring peritoneal dialysis or who have nephrotic syndrome.

- Hypertriglyceridemia in CKD is likely due to decreased lipoprotein lipase (LPL) activity, leading to less catabolism of chylomicrons and very low-density lipoproteins (VLDL). Secondary hyperparathyroidism also contributes to lowered LPL synthesis.

- In nephrotic syndrome, hypoalbuminemia results in hepatic overproduction of lipoproteins containing apolipoprotein B and their impaired catabolism, which leads to hyperlipidemia.

- According to the 2011 Study of Heart and Renal Protection (SHARP) trial, recommendations vary regarding statin initiation for primary prevention in patients with CKD who do not require dialysis and have no CVD risk factors. Some clinicians prescribe statins for all patients with an eGFR < 60 mL/min/1.73 m² while others will initiate only if the patient’s 10-year ASCVD risk score is > 7.5%.

- The SHARP study illustrated a lower composite outcome of coronary death, myocardial infarction, stroke, and revascularization procedures at 5 years in patients with CKD who underwent dialysis and received simvastatin and ezetimibe versus placebo. However, there was no difference in all-cause mortality between the groups.

- Based on a meta-analysis of more than 50,000 patients, it is recommended that a statin be initiated for secondary prevention in those with CKD who do not require dialysis but have cardiovascular risk factors such as diabetes mellitus, coronary artery disease (CAD), history of ischemic stroke, transient ischemic attack (TIA), or peripheral arterial disease.

- In contrast, the Die Deutsche Diabetes Dialyse (4-D) trial showed no significant effect of atorvastatin on the primary composite outcome of cardiovascular death, nonfatal myocardial infarction, and stroke in patients on hemodialysis with type II diabetes mellitus and elevated LDL cholesterol at 4 years. However, there was a significant reduction in cardiac events in the statin group. The AURORA (A Study to Evaluate the Use of Rosuvastatin in Subjects on Regular Hemodialysis: An Assessment of Survival and Cardiovascular Events) trial showed similar findings.

- For hyperlipidemia and hypertriglyceridemia in nephrotic syndrome, treatment of the underlying disease is the main form of management. Adjunctive treatments include diet modification, statins, bile acid sequestrants, and fibrates.

- Fenofibrates are commonly avoided in patients with CKD but may be indicated in uncontrolled hypertriglyceridemia. Of note, fenofibrates can cause a reversible increase in serum creatinine and decrease in estimated glomerular filtration rate that resolves upon medication discontinuation. The etiology of this occurrence is not currently known.

- Based on these studies, the Kidney Disease Improving Global Outcomes (KDIGO) organization published lipid management guidelines in 2013 recommending statins for all patients with CKD who do not require dialysis and are at least 50 years of age. For adults 18 to 49 years of age who have CKD and do not require dialysis or kidney transplantation, statins are recommended if there is a history of coronary artery disease, diabetes mellitus, stroke, or an ASCVD risk > 10%. Statin
initiation is not recommended for patients starting dialysis who are not currently on a statin; however, KDIGO supports continuing a statin if the patient is already taking one prior to starting dialysis.10

REFERENCES


